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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,958	03/03/2004	Qinbai Fan	GTI-1556	5068
33058 7590 04/12/2007 MARK E. FEJER GAS TECHNOLOGY INSTITUTE 1700 SOUTH MOUNT PROSPECT ROAD DES PLAINES, IL 60018			EXAMINER FICK, ANTHONY D	
			ART UNIT 1753	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		04/12/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/791,958

Applicant(s)

FAN ET AL.

Examiner

Anthony Fick

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 January 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 January 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Remarks

1. Applicant's amendments to the claims have overcome the previous rejections under 35 U.S.C. 112 second paragraph. The rejections are therefore withdrawn.

Drawings

2. The drawings were received on January 22, 2007. These drawings are acceptable.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1 through 28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The subject matter that was not described in the specification is a water permeable photovoltaic device. The examiner has considered several factors to make the determination that one of ordinary skill in the art would not be able to recreate the applicant's claimed inventions without undue experimentation. The breadth of the claims is narrow in terms of requiring a water permeable photovoltaic device, but broad in that the claims are not limited to a specific photovoltaic material. Applicant's invention is a type of device that is within prior art and the state of the prior art is

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advanced in terms of photovoltaic photoelectrochemical devices. Some examples of prior art include Deng et al. (U.S.P.G.Pub 2005/0211290), Mauk (U.S.P.G.Pub 2004/0003837) and Graetzel et al. (U.S. 6,936,143). The level of ordinary skill in the art is high along with a high level of predictability within the art. However, the amount of direction given by the inventor to create the water permeable photovoltaic devices is very little. Applicant's state within the specification the photoelectrodes are water permeable and are comprised of water permeable components, but do not give specific examples of such water permeable components. Further the specification does not provide any working examples to give any direction in creating the water permeable photovoltaic devices. The prior art in the area of photovoltaic devices repeatedly describes methods and apparatuses that protect photovoltaic devices from contact with water. The photovoltaic cells that are used in photoelectrodes are covered with specific layers to protect the cells from contact with the water, see Mauk, Deng et al. and Graetzel et al. Therefore, the prior art teaches away from contact with water for photovoltaic devices and hence it is not well known how to create a water permeable photovoltaic device. The amount of experimentation required to recreate the claimed devices on the basis of the disclosure is extremely high as one of ordinary skill would be required to find the appropriate material and then make the material water permeable and still work as a photovoltaic device. There is no direction within the disclosure or the prior art to assist in making the present invention. Thus for the reasoning above, it is the position of the examiner that the water permeable photovoltaic devices within the present claims are not enabled.

Response to Arguments

5. Applicant's arguments filed January 22, 2007 have been fully considered but they are not persuasive. Applicant argues that the water permeable photovoltaic device in the claims is enabled by the specification. Applicant states that figures 4 and 5 show a water permeable photoelectrode as described within paragraphs 0026 to 0029 of the specification. Applicant further states that the metallic substrate is perforated thereby enabling water to contact and pass through the solar cell, rendering the solar cell water permeable. Applicant last states that the use of water permeable photoelectrodes is in fact fully enabled by the description (see Remarks pages 16 to 18).

The examiner respectfully disagrees. While the applicant's specification does show a perforated metal substrate and this does allow water to contact and pass through the solar cell, applicant has not addressed how these layers still function as a solar cell with water contacting and passing through them. As stated above, the prior art devices repeatedly teach away from solar cells having any contact with water, providing special protective layers to isolate the water from the solar cells. The water is destructive to the solar cell material and the presence of water within the cell would short out the solar cell, thus preventing the cell from operating as a photovoltaic device. Applicant has not provided any direction in this protection area. It is suggested that a declaration under 37 CFR 1.132 be provided to show why the photovoltaic cell of applicant's instant invention does not suffer any of the damaging effects of contact with water and does not short out with water passing through the cell as within prior art teachings. The specification as written does not teach any features to allow the solar

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cell to contact water and not short out and thus does not enable a working photovoltaic device that is water permeable. Therefore the rejection is maintained.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Fick whose telephone number is (571) 272-6393. The examiner can normally be reached on Monday - Friday 7 AM to 4 PM.

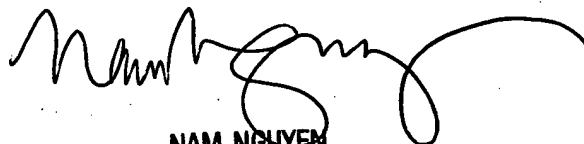
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Anthony Fick
AU 1753
April 10, 2007

ADF



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